



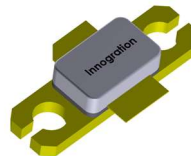
Gallium Nitride 28V 60W, RF Power Transistor

Description

The GTAH58060GX is a 60W internally matched, GaN HEMT, designed from 4.4 to 6.0GHz, especially 5G NR or LTE application, as well as either Pulse or CW application

There is no guarantee of performance when this part is used in applications designed Outside of these frequencies.

GTAH58060GX



• Typical performance (on narrow band fixture with device soldered)

$V_{DD}=28V$ $I_{DQ}=10mA$, CW

| Freq (MHz) | P1dB (dBm) | P1dB (W) | P1dB Eff (%) | P1dB Gain (dB) | P3dB (dBm) | P3dB (W) | P3dB Eff (%) |
|---------------|---------------|-------------|-----------------|-------------------|---------------|-------------|-----------------|
| 4800 | 46.09 | 40.6 | 47.7 | 8.96 | 48.28 | 67.3 | 57.8 |
| 4900 | 46.57 | 45.4 | 52.8 | 9.51 | 48.27 | 67.1 | 60.2 |
| 5000 | 46.74 | 47.2 | 54.2 | 10.04 | 48.12 | 64.8 | 59.7 |
| 5100 | 46.87 | 48.6 | 55.8 | 10.65 | 48.01 | 63.3 | 59.9 |
| 5200 | 46.72 | 47.0 | 56.1 | 11.26 | 47.85 | 60.9 | 59.7 |
| 5300 | 46.55 | 45.1 | 55.9 | 11.82 | 47.74 | 60.4 | 59.7 |
| 5400 | 46.36 | 43.3 | 54.7 | 12.26 | 47.73 | 60.3 | 59.0 |
| 5500 | 46.06 | 40.4 | 52.1 | 12.18 | 47.68 | 59.6 | 57.3 |
| 5600 | 45.87 | 38.7 | 50.1 | 11.94 | 47.69 | 59.8 | 56.4 |
| 5700 | 45.96 | 39.5 | 49.7 | 11.66 | 47.82 | 60.5 | 56.3 |
| 5800 | 45.82 | 38.2 | 49.2 | 11.07 | 47.84 | 60.8 | 56.6 |
| 5900 | 45.61 | 36.4 | 49.2 | 10.1 | 47.80 | 60.2 | 56.5 |

Recommended driver: GTAH58018C6

Applications and Features

- Suitable for wireless communication infrastructure, wideband amplifier, EMC testing, ISM etc.
- High Efficiency and Linear Gain Operations
- Thermally Enhanced Industry Standard Package
- High Reliability Metallization Process
- Excellent thermal Stability and Excellent Ruggedness
- Compliant to Restriction of Hazardous Substances (RoHS) Directive 2002/95/EC

Important Note: Proper Biasing Sequence for GaN HEMT Transistors

Turning the device ON

1. Set VGS to the pinch-off (VP) voltage, typically -5 V
2. Turn on VDS to nominal supply voltage (28V)
3. Increase VGS until IDS current is attained
4. Apply RF input power to desired level

Turning the device OFF

1. Turn RF power off
2. Reduce VGS down to VP, typically -5 V
3. Reduce VDS down to 0 V
4. Turn off VGS

Table 1. Maximum Ratings

| Rating | Symbol | Value | Unit |
|-----------------------|----------|--------|------|
| Drain--Source Voltage | V_{DS} | 150 | Vdc |
| Gate--Source Voltage | V_{GS} | -10,+2 | Vdc |



| | | | |
|---|------------|-------------|--------------------|
| Operating Voltage | V_{DD} | 36 | Vdc |
| Maximum Forward Gate Current @ $T_C = 25^{\circ}\text{C}$ | I_{gmax} | 12.5 | mA |
| Storage Temperature Range | T_{stg} | -65 to +150 | $^{\circ}\text{C}$ |
| Case Operating Temperature | T_C | +150 | $^{\circ}\text{C}$ |
| Operating Junction Temperature(See note 1) | T_J | +225 | $^{\circ}\text{C}$ |
| Total Device Power Dissipation (Derated above 25°C , see note 2) | P_{diss} | 75 | W |

Note: 1. Continuous operation at maximum junction temperature will affect MTTF
2. Bias Conditions should also satisfy the following expression: $P_{diss} < (T_J - T_C) / R_{JC}$ and $T_C = T_{case}$

Table 2. Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------|------|
| Thermal Resistance, Junction to Case $T_C = 85^{\circ}\text{C}$, $T_J = 200^{\circ}\text{C}$, RF CW operation | $R_{\theta JC}$ | 1.7 | C/W |

Table 3. Electrical Characteristics ($T_C = 25^{\circ}\text{C}$ unless otherwise noted)

DC Characteristics

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|--------------------------------|--|--------------|-----|------|-----|------|
| Drain-Source Breakdown Voltage | $V_{GS} = -8\text{V}$; $I_{DS} = 14.4\text{mA}$ | V_{DSS} | 150 | | | V |
| Gate Threshold Voltage | $V_{DS} = 28\text{V}$, $I_{D} = 14.4\text{mA}$ | $V_{GS(th)}$ | -4 | | -2 | V |
| Gate Quiescent Voltage | $V_{DS} = 28\text{V}$, $I_{DS} = 100\text{mA}$, Measured in Functional Test | $V_{GS(Q)}$ | | -2.5 | | V |

Typical performance

4.8-5.9GHz

Figure 2: Small signal gain and return loss Vs Frequency

$V_{DS} = 28\text{V}$, $I_{DQ} = 100\text{mA}$, input power = 0dBm

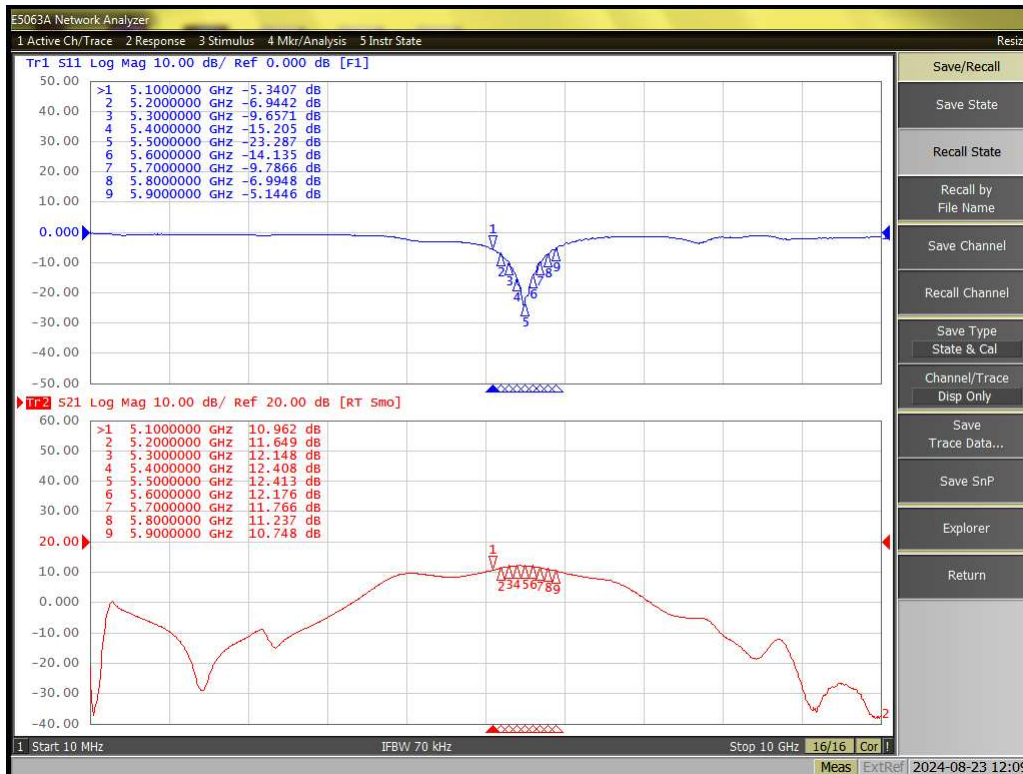




Figure 3: Efficiency and power gain as function of Pout

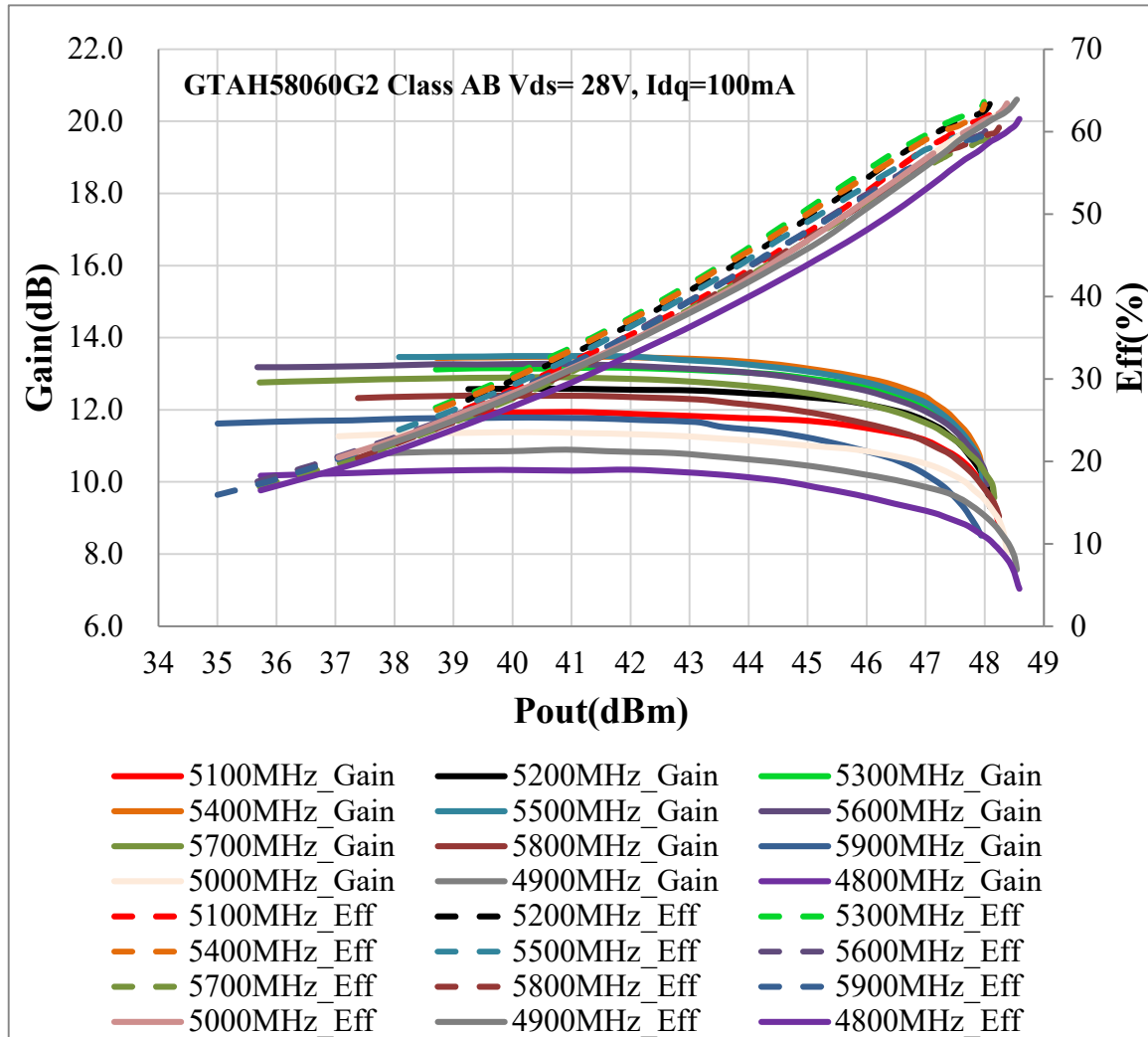
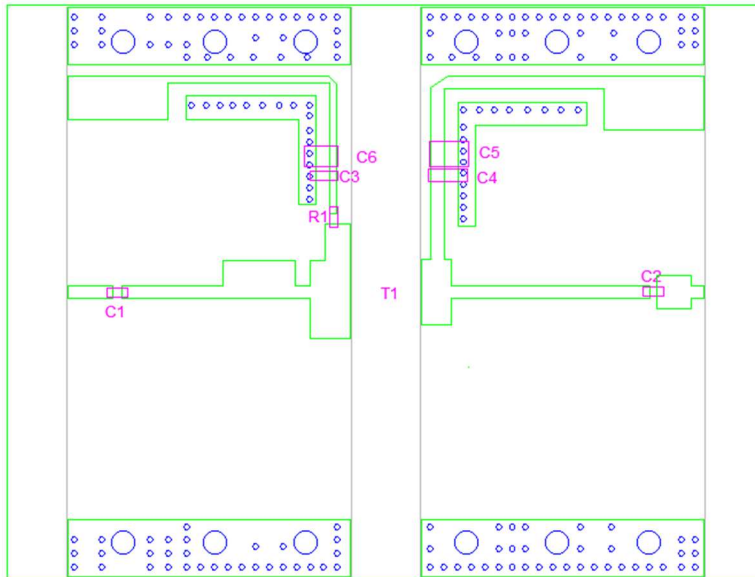




Figure 4: Picture and Bill of materials of 4.8-5.9GHz wide band application circuit
(Layout Gerber file upon request, 20mils RO4350B)



| Component | Value | Quantity |
|-------------|-------------|----------|
| U1 | GTAH58060GX | 1 |
| C1、C2、C3、C4 | 3.9pF | 4 |
| C5、C6 | 10uF/63V | 2 |
| R1 | 10 Ω | 1 |



Package Outline

Flanged ceramic package; 2 leads

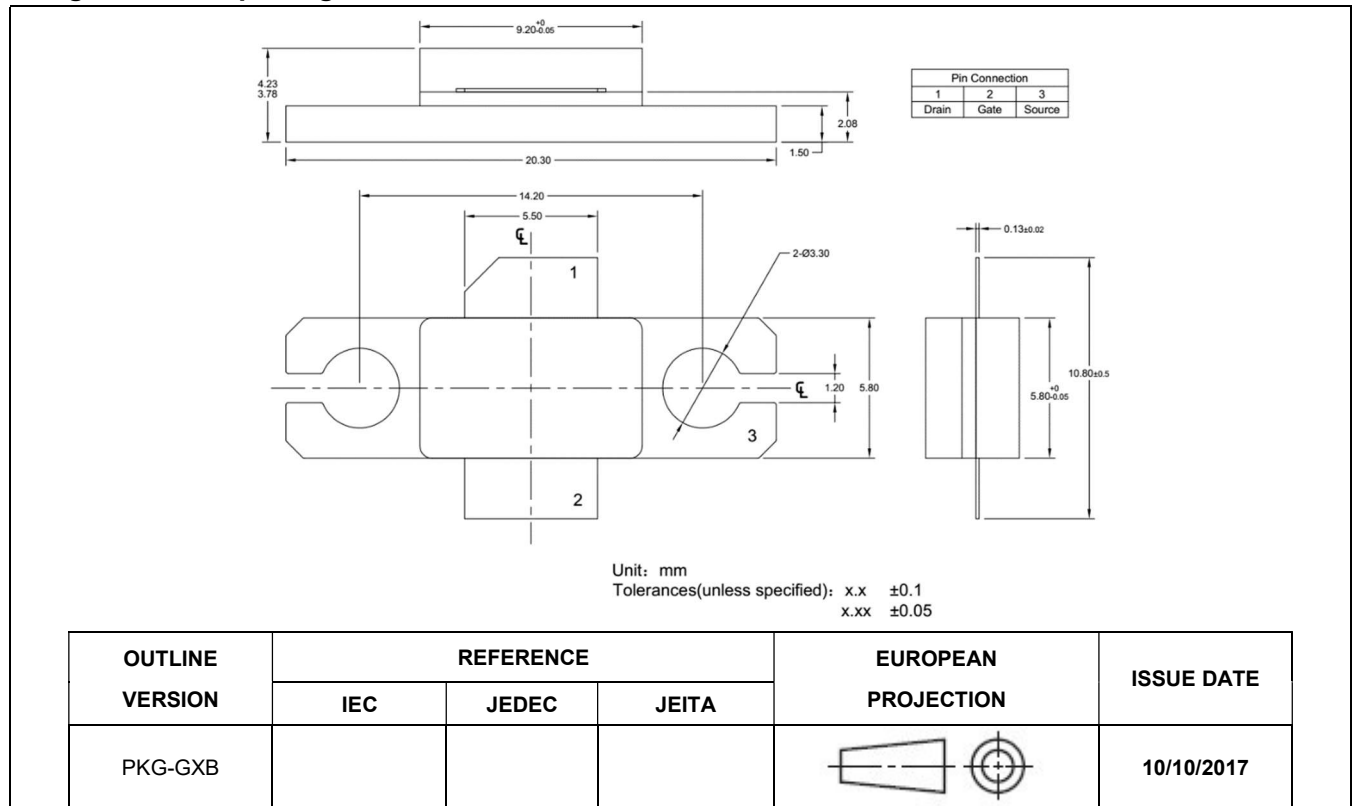


Figure 1. Package Outline PKG-G2E



Revision history

Table 5. Document revision history

| Date | Revision | Datasheet Status |
|-----------|----------|--------------------------------|
| 2023/9/25 | V1.0 | Preliminary Datasheet Creation |
| 2024/1/14 | V1.1 | Add 5.1-5.9GHz data |
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Application data based on LWH-24-33

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